# The Economics of Central Banking

Cukierman, A.

*Publication date:*
1996

# The Economics of Central Banking

By

Alex Cukierman*

February 1996

Forthcoming in : Wolf Holger (ed.), **Macroeconomic Policy and Financial Systems**, The Macmillan Press, Proceedings of the December 1995 Tunis Congress of the **International Economic Association**.

---

*School of Economics, Tel-Aviv University and Center, Tilburg University. I would like to thank, without implicating, Francesco Lippi, Robert Scharrenborg, Yossi Spiegel, Lars Svensson and participants at the session on the economics of central banking at the Eleventh World Congress of the International Economic Association in Tunis, Tunisia.

# 1. Introduction

Since 1989 twenty five countries in different parts of the world have substantially upgraded the legal independence of their central banks[1]. This trend is particularly remarkable in view of the fact that during the preceding fourty years changes in central bank (CB) legislation were relatively rare[2]. In parallel there has been a remarkable upsurge in both theoretical and empirical research on the meaning of central bank independence (CBI), its measurement, the interaction between government and the CB, the effect of CBI on the performance of the economy, the design of optimal contracts for central bankers, the functioning of nominal targets, and the deeper determinants of CBI. This paper is a broad survey of recent developments in this rapidly growing area. It addresses central banking issues that are relevant for developed as well as for developing economies. Although the paper reviews formal as well as informal results it is written in a form that is meant to make it accessible to a wide audience.

---

[1]The countries are Belgium, France, Italy, Portugal, Spain and New-Zealand within the group of industrial economies, Argentina, Chile, Colombia, Mexico, Venezuela and Pakistan in the (non previously socialist) developing economies and Belarus, Estonia, Kazahkstan, Lithuania, Russia, Ukraine, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic and Slovenia in the group of former socialist countries. Many of these countries completely overhauled the existing central bank charter. Further details appear in chapter 4 of Maxfield (1995).

[2]Details on changes in central bank legislation prior to 1989 appear in the appendix to chapter 19 of Cukierman (1992).

The recent trend towards CBI is due to a confluence of several different factors in different parts of the world. Underlying all of this factors is an increased quest for price stability that is due to two main factors. First, following the stagflation of the seventies and the adverse economic performance of some high inflation countries, in Latin America and elswhere, conventional wisdom concerning inflation and real growth has changed. Whereas, during the sixties the accepted view was, in line with Keynesian dogma, that some inflation is good for growth, the accepted view, during the eigthie and the nineties, became that inflation and the associated uncertainties retard growth. The good economic performance of some low inflation countries like Germany and Japan provided added impetus to this view. Second, the rapid growth and internationalization of capital markets raised the importance of price stability as governments and private investors sought to enhance their access to broadening world financial markets[3].

Why did so many countries choose to raise their commitmment to price stability by upgrading CBI rather than through other means? There are several reasons for this. First, the breakdown of other institutions designed to safeguard nominal stability like the European Monetary System (EMS) and the Bretton Wood System intensified the search for alternative institutions. Second, the good track record of the highly independent Bundesbank demonstrated that CBI can function as an effective device for assuring nominal stability. Third, the acceptance of the Maastricht Treaty by the European Economic Community (EEC) implies that in order to conform with the Treaty many countries in the Community have to upgrade the independence of their CB as a precondition for membership in the European Monetary Union (EMU) if and when such a union comes into being. The fact that such a stipulation has been introduced in the Treaty in the first place is related to the good record of the Bundesbank and to the central position of Germany within the Community. Fourth, after recent successful stabilization of inflation, particularly in Latin America, policymakers are looking for institutional arrangements capable of reducing the likelihood of high and persistent inflation in the future. In view of recent experience, raising CBI is a natural way to achieve this objective. Fifth, the upgrading of CBI (and in many cases the creation of a Western type CB) in the former socialist countries is part of the more general attempt of these countries to create the

[3]This hypothesis is developed and investigated in Maxfield (1995).

institutional framework needed for the orderly functionning of a market economy. The fact that many of these new central banks are quite independent (at least from a legal point of view) is no doubt motivated by recent evidence from industrialized economies suggesting that inflation and legal independence are negatively related and that independence and growth are either positively related or unrelated.

In spite of this trend, the notion that having a highly independent and conservative CB that focusses only or mainly on price stability has not gone unchallanged. The argument is that when CBI is too high monetary policy cannot be used for stabilization of real output. For example Debelle and Fischer (1994) claim that the loss of output per unit of reduction in inflation (the so-called sacrifice ratio) is higher in Germany than in the US. They conclude, therefore, that the degree of independence of the Bundesbank is excessive. In a wider sense the current debate between the proponents of a highly independent and conservative CB and a somewhat more flexible and independent but accountable bank that can **also** engage in stabilization policy echoes the old debate between Keynesians and Monetarists. The framework of the current debate, however, is focussed on the choice of institutions rather than on the choice of policies and, most importantly, it recognizes that monetary policy is endogenous and subject to political influence.

The survey is organized as follows. Section 2 takes a look at the intellectual case for CBI. Section 3 presents and discusses the relative advantages and disadvantages of existing measures of legal independence and of three behaviorally oriented measures of actual independence for industrial economies and for developing economies. Section 4 briefly summarizes existing evidence on the relation between these indices and the performance of the economy with respect to inflation, accomodation, growth, the sacrifice ratio, investment, productivity growth, economic fluctuations and interest rates. Section 5 reviews recent hypotheses about the determinants of CBI and discusses existing preliminary evidence on this question. Section 6 discusses and evaluates the recent theoretical literature on optimal contracts for central bankers. Section 7 considers the case for nominal targets or anchors and compares between three nominal targets: monetary targets, exchange rate targets and inflation targets. Section 8 reviews conventional wisdom about possible tradeoffs between financial stability and price stability, and discusses the pros and cons of assigning the authority for supervision of the financial system to the CB. Section 9 presents and discusses some

of the particular problems encountered by new central banks in the former socialist economies. Economic and political aspects of the road to monetary union in Europe are discussed in section 10. Section 11 briefly reviews some recent results about the effects of instrument uncertainty and uncertainty about the structure of the economy on policy choices.

# 2. The Case for Central Bank Independence

The intellectual case for CBI rests on two pillars, one theoretical and the other empirical. The theoretical case is rooted in the idea that money is neutral in the long run and that the long run becomes shorter when monetary policy is frequently misused to achieve real objectives. Here the long run refers to the time it takes for inflationary expectations to adjust and to get reflected in various nominal contracts in labor and financial markets.

## 2.1 The Theoretical Case

In the short run monetary expansion can be used to achieve a variety of real objectives like low interest rates, a high level of economic activity and employment, seignorage financing of the government budget and the prevention of financial crises. Similarly, depreciation of the nominal exchange rate can be used to, temporarily, improve the current account of the balance of payments. Although policymakers dislike inflation, they are usually willing to accept some inflation in order to achieve one or more of these objectives. When monetary policy is conducted in a discretionary manner the public will, therefore, rationally expect this inflation rate in advance and will embedd it in nominal wage and capital market contracts.

Due to this "preventive measure" by the public policymakers will have to inflate just in order to maintain the real equilibrium that would have arisen under a commitment to zero inflation. In a nutshell, this is the basic intuition of the well known dynamic inconsistency of monetary policy first pointed out by Kydland and Prescott (1977) and elaborated in Barro and Gordon (1983). It implies that, under discretion, monetary policy is subject to a suboptimal inflationary bias when at least one

or more of the above motives for monetary expansion operates[4].

The empirical observation that rates of inflation in all countries are positivc most of the time is consistent with the notion that monetary policy is usually subject to an inflationary bias. Motives for monetary expansion may vary across countries and country groups. Thus, employment considerations are relatively more important within industrial countries and seignorage or financing of budget deficits are relatively more important in developing economies. The revenue (for government) motive for monetary expansion is particularly important in developing countries with limited access to international capital markets. But, ultimately, all motives lead to an inflationary bias. This bias can be avoided or diminished by delegating monetary policy to a central banker who has the freedom to choose monetary policy and who cares only or mostly about price stability[5].

## 2.2 The Empirical Case

The empirical case for CBI rests on a growing body of empirical evidence showing that , on average, countries with more independent central banks have lower rates of inflation and either the same or higher rates of growth of per capita output. Many of the existing studies focus on the industrialized economies and use indices of legal independence as proxies for actual independence. Since compliance with the law in those countries is relatively high legal independence is a reasonable proxy of actual independence for the industrializesd democracies. On the other hand compliance with the law in most developing countries is relatively poor. Hence more behaviorally oriented proxies of (lack of) independence like the turnover of CB governors and the vulnerability of their office to political change are used for those countries[6]. When the appropriate indices of independence

---

[4]A fuller intuitive discussion of this mechanism appears in chapter 2 of Cukierman (1992). A more structured analysis of the choice of monetary policy when various motives for monetary expansion operate appears in chapters 3-5 and 7.

[5]This type of central banker is often reffered to as a Rogoff (1985) conservative central banker. Delegation of authority to such a central banker reduces the inflationary bias but prevents the utilization of monetary policy for stabilization of real shocks to output. Those issues are discussed more fully in section 6 below.

[6]A detailed discussion of the various indices and their relationships with economic performance appears in section 3 and 4 below.

are used for each group of countries inflation and CBI turn out to be negatively related. This result is robust to the type of legal index used for developed economies and to the type of behavioral index used for developing countries. But beyond those econometric results the case for CBI also rests on the very good record of nominal stability of central banks (like the Bundesbank and the Swiss National Bank) that enjoy a high degree of legal independence.

The bulk of existing evidence supports the view that for the industrialized countries there is no connection between legal independence and growth. For LDC's there is a, ceteris paribus, positive association between growth and behavioral measures of CBI.

### 2.3 How Effective is Legal Independence?

Do those results mean that by upgrading the legal independence of its CB a country can **assure** price stability? As will become clear from the rest of this survey the answer to such a strong question is probably "not necessarily" for a number of reasons. First a higher level of legal independence is not always translated into a corresponding higher level of **actual** independence. Obviously, upgrading of legal CBI is more likely to achieve price stability in countries in which the law is applied more seriously. Second, in the presence of narrow capital markets and budget deficits legal independence may not suffice to prevent a seignorage hungry government from dipping into the vaults of the CB.

Nevertheless, reasonably high legal autonomy of the CB is a useful first step for building up the institutional climate needed for actual independence. Legal independence does not assure actual independence but it opens the door for it when additional complementary conditions are satisfied. On the other hand without legal independence the CB is certainly dependent on political authorities. In short legal independence is a necessary but not sufficient condition for a truly independent CB.

Suppose now that the CB has achieved both the legal and the actual independence to pursue price stability even if that means disregarding other potential objectives. Will nominal stability be achieved in such a case? I believe the answer is yes with high probability.

# 3. Indices of Central Bank Independence-Their

# Usefulness and Limitations

Systematic empirical work on the relationships between CBI and the performance of the economy became possible only when structured indices of independence were developed during the second part of the eighties and the beginning of the nineties. Most early indices are based on a number of legal attributes of CB laws and are limited to industrial economies. Subsequent work extended the coverage of legal indices to Less Developed Countries (LDC's) and attempted to provide more behaviorally oriented indices of independence. Among those are a questionnaire based index of independence,the actual turnover of CB governors and the vulnerability of the governor's office to political change.

As monetary policymakers and monetary economists well know actual CBI depends on a multitude of formal and informal factors some of which are difficult to quantify in a systematic manner. As a consequence existing indices are incomplete and noisy indicators of independence. This does not mean that they are uninformative. But it does imply that, when possible, their use should be supplemented by judgement in light of the problem under consideration. In particular some indices are more appropriate for some purposes than for others. For example legal independence is more likely to be a reasonable proxy for actual independence in Developed Countries (DC's) than in LDC's because the general level of law abidance in the first group of countries is higher. Furthemore, in some cases, several indices may be usefully combined to get a fuller picture, since they capture different aspects of independence.

Legal indices of independence have the advantage that they are more likely to be exogenous with respect to the economy. But due to their small degree of over time variation (at least until 1989) they generally have poor explanatory power for developments in economic variables **within** countries. By contrast more behaviorally oriented indices, like the turnover of CB governors, are more strongly correlated with actual economic developments but, unfortunately,are also more likely to be affected by reverse causality.

## 3.1 Legal Indices of CBI

The pioneering attempt to codify legal CBI for a subset of the industrial economies is due to

Bade and Parkin (1980,1985). Alesina (1988,1989) extends this coding within the group of industrial economies. This index focusses on questions like : Does the CB have final authority over monetary policy? Are there government officials on the board of the CB? and are more than half of the Bank policy board members appointed by government? Grilli, Masciandaro and Tabellini (1991) present an index consisting of two parts : policy independence and economic independence. This index covers most of the industrial countries. In addition to the questions above the first part of the index focusses on appointment procedures for high officials of the CB, the length of their term in office and the existence of a statutory requirement that the Bank pursue monetary stability. The second part focusses on the extent to which the law shields the CB from lending to government and on whether banking supervision is partially or totally under the authority of the CB.The last question is based on the presumption that a Bank that is not saddled with banking supervision finds it easier to focus on price stability.Eijffinger and Schaling (1992,1993) construct, for twelve industrial countries, an index that focusses on three issues : the location of the final responsibility for monetary policy,the absence or presence of a government official on the board of the CB and the fraction of board appointees that is made by government. Eijffinger and Schaling embedd their judgment that the location of the ultimate responsibility for monetary policy is particularly important in the index by giving a double score to CB laws in which the CB has sole authority over monetary policy.

Cukierman (1992,ch. 19) and Cukierman, Webb and Neyapti (1992) provide an index of legal independence for all the industrial countries and for up to fivty developing economies on a unified basis. This index is aggregated from sixteen basic legal charateristics of CB charters which are grouped into the following four clusters : 1.the appointment,dismissal and legal term of office of the chief executive officer of the Bank (usually the governor) ; 2.the institutional location of final authority for monetary policy, and procedures for the resolution of conflicts between government and the Bank ; 3.the importance of price stability in comparison to other objectives like high employment and financial stability ; 4.the stringency and universality of limitations on the ability of government to borrow from the CB, at market or at subsidized rates, or to instruct the CB to lend to third parties. The index covers the period 1950-1989 and is also presented for four subperiods that correspond roughly to the four decades included in that period.The breakdown by subperiods reveals that average legal independence as well as its components changed very little between 1950 and 1989 in most

countries.

The correlation between the different legal indices, for the common countries and periods, is positive but not always large.This reflects the difference in judgment made by the various authors about the relative importance of specific legal provisions for overall legal independence. By and large all indices rank the same countries at the top and at the bottom of the legal independence scale and differ on the ranking for intermediate cases.A more detailed discussion of the various legal indices and of their interrelationships appears in Eijffinger and de Haan (1995).

## 3.2 Questionnaire Based Independence

Cukierman (1992,p. 386) and Cukierman, Webb and Neyapti (1992) produced a questionnaire based index of independence for twenty four countries during the eighties.This index is particularly useful for identifying substantial discrepancies between actual practice and the letter of the law.The questionnaire based index is aggregated from answers to the following questions: 1.How much overlap is there between the tenure of the high officials of the CB and of the central government? 2.How well are limitations on government borrowings from the CB adhered to in practice? 3.In whose favor have conflicts between government and the CB been resolved in practice? 4.Who determines the budget of the CB,the salaries of its high officials and the allocation of its profits? 5.Are there quantitative monetary stock targets? 6.Are there formal or informal interest rate targets?

Since responses to the questionnaire were secured from qualified individuals at various central banks it may be argued that, on average, their responses are biased towards representing their respective banks as being more independent than they really are. Altough this very well may be the case, this tendency alone does not necessarily distort the **relative** ranking of banks unless the officials of some banks are more susceptible to such biases. The correlation between the questionnaire based index of independence and legal independence is relatively small suggesting that those two indices capture different dimensions of independence. The questionnaire based index makes a step towards incorporation of actual behavior in the index of CBI. However it is based on **judgments** about behavior rather than on actual behavior. The next two indices are based on actual behavior.

## 3.3 Turnover of Central Bank Governors

CB laws do not specify the limits of CB authority for all possible contingencies thus leaving a lot of room for interpretation. Even when the law is relatively explicit, factors such as tradition, personalities and power politics may affect actual CBI. A striking example is Argentina, prior to the 1991 reform. Until that time the legal term of office of the governor was four years. But there also was an informal tradition according to which the governor had to offer his resignation following a change in government and sometimes even of finance minister. As a consequence the average term in office of Argentinian governors during the eighties was ten months rather than four years.The extreme case of Argentina suggests that, at least above a certain threshold, the turnover of CB governors is a proxy for (lack of) actual independence.

Low turnover does not necessarily imply a high level of independence-a relatively subservient governor may endure in office precisely because he does not stand up to the executive. This may be true for countries with relatively low turnover rates like Iceland, the UK, and the USA. In such countries turnover is probably unrelated to independence. On the other hand,it is very likely that above some critical threshold CBI is lower the higher turnover for at least two reasons. First, for sufficiently high turnover rates the governor's tenure is shorter than that of the executive branch making him more susceptible to political pressure. Second, for very short terms of office such as three years or less (turnover rates of 0.33 or larger) it is generally more difficult to implement a long term policy like price stability because of the long and variable lags between money and prices.

For the period between 1950 and 1989 the highest turnover within industrial countries is 0.2 and it is above that for about two thirds of the LDC's reaching a maximum of 0.93 for Argentina (Cukierman,1992,p. 384).Due to this fact Cukierman (1992) and Cukierman, Webb and Neyapti (1992) conclude that turnover is a reasonable proxy for (lack of) CBI within LDC's. The second reference also contains a breakdown of the turnover data into four subperiods that correspond roughly to the four decades between 1950 and 1989.

## 3.4 Political Vulnerability of the Central Bank Governor

This measure is based on the propensity of the governor of the CB to lose his position within a short period of time following a political transition. Formally,the political vulnerability of the CB is defined as the fraction of political transitions that is followed within six months (or within one

month) by a replacement of the CB governor. Vulnerability is an index of gross political influence on the CB. For some countries like the US it is zero implying that there is no evidence of gross political influence for that country. This obviously does not mean that the Fed is totally immune from political pressure. Havrilesky (1993) among others has documented some of the ways through which these pressures manifest themselves. But those channels of influence are more subtle and should probably be classified lexicographically below the type of influence evidenced through the vulnerability index. In a sense vulnerability is a refinement of the turnover variable that focusses only on that part of turnover that follows shortly after political transitions[7].

Using a sample of sixty seven countries (twenty industrialized and fourty seven LDC's) between 1950 and 1989 Cukierman and Webb (1995) find that the average propensity to replace the governor of the CB is significantly higher shortly after political transitions than in other periods. Statistical tests reveal that the appropriate cutoff between "political" periods (in which a change of governor is likely to have been caused by the immediatly preceding political transition) and "non political" periods (in which a change of governor is less likely to be due to the last political transition) is six months, and that governor's turnover is more than twice larger in political than in non political periods.

This finding is consistent with the view that gross political influence on the CB has been the rule rather than the exception till the end of the eighties. As much as a quarter of all political transitions are followed within six months by a replacement of the governor. But there are substantial differences between country groups. The within six months vulnerability is only 0.1 in developed countries and three times higher in LDC's. There also are substantial differences in vulnerability by regime type within LDC's. Average vulnerability is highest in "mixed regime" countries that alternate between democratic and authoritarian regimes (0.39) and lowest in LDC's with always authoritarian regimes (0.22). It assumes an intermediate value of 0.3 in LDC's that had a democratic regime throughout the entire sample period.

---

[7]Turnover is formally equal to the frequency of political transitions multiplied by vulnerability plus non political turnover.The last concept is defined as the frequency of governor's changes in periods that are more than six months (or more than one month) away from the latest political transition.

The first table in the appendix to Cukierman and Webb (1995) presents, within six months, vulnerability indices for individual countries for two subperiods : 1950-1971 and 1972-1989.The quality of the index is better in countries and subperiods in which there are more political transitions. The reason is that in such cases the probability that a non political replacement of the governor is classified as political or vice-versa is relatively smaller. As was the case with the other indices, vulnerability is thus a noisy but not uninformative indicator. It shares with turnover the advantage of being based on actual behavior and the disadvantage of being potentially subject to reverse causality from economic variables. Its advantage over turnover is that it is applicable to developing as well as to developed economies. By focusing on the relation between instability at the CB and political instability the vulnerability index provides more delicate institutional information about the interaction between the political establishement and the CB than does turnover alone.

# 4. Central Bank Independence and the Performance of the Economy

There is by now a substantial body of empirical work that documents the empirical relationships between the indices of CBI and economic variables like inflation, growth, investment, productivity growth and interest rates. This section briefly surveys the main findings without attempting to be exhaustive. Further details may be found in Cukierman (1993) and in section 4 of Eijffinger and de Haan (1995).

## 4.1 CBI and the Distribution of Inflation

Most of the studies that investigate the relationship between the distribution of inflation and CBI find that both the mean and the variance of inflation are negatively related to measures of legal independence in the industrial economies (Grilli, Masciandaro and Tabellini (1991), Cukierman (1992), Alesina and Summers (1993) and Debelle and Fischer (1994)). But there is no significant relationship between the distribution of inflation and legal independence in developing economies (Cukierman (1992) ch. 20 and Cukierman, Webb and Neyapti (1992)). Pal (1993) finds that

compliance with the law is substantially poorer in LDC's than in developed economies[8]. Hence the lack of association between legal independence and inflation may be due to the fact that legal independence is a poorer proxy for actual independence in LDC's or to the fact that there is no association between actual independence and inflation in this countries. One way to discriminate between those hypotheses is to utilize behavioral indices of independence like turnover as a measure of (lack of) actual independence in LDC's. When this is done a strong positive relationship emerges between inflation and turnover supporting the view that the negative relationship between inflation and **actual** independence extends to LDC's (Cukierman (1992) ch. 20 and Cukierman, Webb and Neyapti (1992))[9].

There is evidence that inflation and political instability are positively associated (an example is Cukierman, Edwards and Tabellini (1992)). An interesting question is how much of this association is direct and how much of it is due to the existence of political influence on the CB. To answer this question inflation and the standard deviation of inflation were regressed on vulnerability of the CB, non political turnover and several measures of political instability. Altough they usually had positive coefficients the political instability variables were by and large insignificant. But the coefficients of vulnerability and of non political turnover were always positive and significant supporting the view that a non negligible part of inflation and of its variability are due to political influence on the CB and to instability at the bank rather than to the direct effect of political instability on the distribution of inflation (Cukierman and Webb(1995)).

Furthermore the dissagregation of turnover into its constituent parts helps to explain differences in inflation between developed and developing economies that could not have been accounted for by turnover. Once the constituents of turnover are used separately and account is taken of different types of political instability, the level of development no longer contributes to

---

[8]More specifically Pal finds that the divergence between the legal and the actual term in office of CB governors is substantially larger in developing than in developed economies.

[9]There is evidence of two way causality between turnover and inflation. Altough this implies that part of the association between inflation and turnover is due to causality from inflation to turnover there is also evidence of causality in the opposite direction which supports the statement in the text.

explaining differences in inflation outcomes.

The main conclusion from empirical studies on the relationship between CB autonomy and the distribution of inflation is that CBI is inversely related to the level and variability of inflation in both developed and developing economies. However the independence measures used to reach this conclusion differ between the two groups of countries. In developed countries legal independence is used as a proxy for autonomy and in LDC's turnover or its two components - vulnerability and non political turnover are used. This difference in choice of indices is due to the fact that legal independence is a poor proxy for actual independence in LDC's because of substantial deviations between actual practice and the letter of the law.

One of the most robust empirical regularities in the area of inflation is the positive cross sectional association between the mean and the variability of inflation (Logue and Willet (1976)). Cukierman (1992, ch. 18) proposes an explanation of this relation that links both of these variables to CBI. Recent tests of this theory that use both legal as well as behavioral indices of independence, like vulnerability, show that about thirty percent of the strong association between inflation and its variability is due to their common link to existing indices of CBI (Cukierman and Webb (1995)).

## 4.2 Monetary Reaction Functions and CBI

Are there systematic relationships between independence and the way money growth reacts to developments in the economy? The evidence here is relatively scarce and somewhat mixed. Johnson and Siklos (1994) conclude that there is no systematic relation between monetary reaction functions and legal independence in a group of seventeen OECD countries. On the other hand they find that the type of exchange rate regime does have an effect.

Using a similar sample of seventeen industrial countries Cukierman, Rodriguez and Webb (1995) find that, controlling for the type of exchange rate regime, monetary accomodation of wage increases is lower in countries with more legally independent central banks Interestingly it is also lower in countries with unilateral pegs than in countries with flexible exchange rates. There is also a positive, altough not always significant, relation between wage accomodation and the political vulnerability of the CB. Their evidence does not support the view,implicit in Rogoff (1985), that policy is less activist in countries with more legally independent central banks.

Siklos (1994) examines whether the reaction functions of five developing countries whose degree of legal independence has been upgraded since 1989 differ from those of a control group in which there were no reforms in the charter of the CB and finds no significant differences.

## 4.3 Growth and CBI

Most of the evidence on the relationship between the rate of growth of per capita GDP and CBI for developed economies shows that there is no significant relation between those two variables (Grilli, Masciandaro and Tabellini (1991), de Haan and Sturm (1992), Alesina and Summers (1993)). This led Grilli et. al. to conclude that CBI is a "free lunch" since it is associated with lower inflation and the same level of real growth. In these studies CB autonomy is proxied by legal independence and growth is related **only** to CBI. However De Long and Summers (1992) find that when one controls for initial GDP legal independence has a significant positive effect on growth.

Evidence for LDC's suggests that, after controlling for various other determinants of growth there is a negative relation between **behavioral** indices of (lack of) independence- like turnover and vulnerability- and growth, but legal independence has no effect on growth (Cukierman, Kalaitzidakis, Summers and Webb (1993), Cukierman and Webb (1995)). In summary the bulk of the evidence supports the view that when there is a significant association between CBI and growth it is positive. This obviously does not necessarily mean that CBI **causes** higher growth. It is possible for instance that behavioral indices of CBI are positively correlated with generally stable economic policies that are conducive to better economic performance. Altough knowledge in this area is rather limited I would venture the conjecture that, particularly in developing countries, part of the beneficial effect on growth is due directly to greater behavioral independence of the CB[10].

Rogoff's conservative central banker paradigm implies that there is a tradeoff between elimination of the inflationary bias and stabilization policy. Debelle and Fischer (1994) compare this tradeoff in Germany and in the US by focussing on the output loss per unit of disinflation (the

[10]Bruno and Easterly (1994) find that growth falls sharply during episodes of high inflation (above fourty percent per year). Such episodes are more likely to occur the lower the independence of the CB.

sacrifice ratio) during recessions in this two countries since the first oil shock. They find that in spite of the greater independence and credibility of the Bundesbank the sacrifice ratio is greater in Germany than in the US. They interpret this finding as evidence that, at the upper end of the distribution of independence, the sacrifice ratio is positively related to CBI.

Alesina and Summers (1993) find no relation between the variability of output growth and legal independence within industrial economies. Using a wider sample of both industrial as well as developing countries Cukierman et. al. (1993) find that the variability in the rate of growth of output is positively related to governor's turnover.. But when they control for the level of development the relationship dissapears. Thus, existing empirical evidence supports the view that there is no relation between CBI and fluctuations in output. Alesina and Gatti (1995) provide a possible theoretical explanation for this finding. The idea is that more independent central banks only reduce output fluctuations that are due to the political business cycle. But since their tendency to engage in stabilization policy is weaker the impact of other sources of fluctuations on output is larger under more independent banks. On this view these two effects offset each other leaving no evidence of a systematic relation between fluctuations in output and CBI.

## 4.4 Investment, Productivity Growth and CBI

The results in the previous subsection raise a question about the channels through which CBI might affect growth. One possibility is that lack of independence deters investment. Another is that it is associated with lower rates of productivity growth. This issue is particularly important in LDC's in which the positive relation between growth ansd CBI appears to be stronger. Using a sample of thirty developing economies Cukierman et. al. (1993) find that, other things the same, private investment as a share of GDP is lower the larger are turnover and political vulnerability of CB governors. Interestingly turnover remains significant even in the presence of measures of political instability. But the effect of behavioral independence on productivity growth is insignificant. In all cases legal independence is, not surprisingly, insignificant.

## 4.5 Interest Rates and CBI

For developed economies there is evidence of a negative relation between expost real deposit

rates and legal independence (Alesina and Summers (1993), Cukierman et.al. (1993)). For LDC's there is evidence of a positive effect of turnover and of vulnerability on the variability of real rates (Cukierman et. al. (1993), Cukierman and Webb (1995)). This leads to the conclusion that, provided the appropriate index of independence is used within each group of countries, there generally is a negative relation between CBI and the variance of expost real rates. A large part of this effect is likely to be due to the, previously reported, negative association between inflation variability and CBI. But there is also evidence that the variability of short and intermediate term nominal rates ( but not of long term rates) is lower when CBI is higher. Thus, the effect of CBI on the variability of real rates is **also** due to its effect on the variability of nominal short term rates.

There is evidence of a negative cross sectional relation between the level of expost real deposit rates and CBI for both industrialized countries as well as LDC's provided legal independence is used as a proxy for independence in the first group and, turnover and vulnerability are used as proxies in the second group (Cukierman et.al. (1993), Cukierman and Webb (1995)). A possible explanation for this finding is that the lower the independence of the CB the stronger the attempts of government to reduce the real return to short term nominal savings through regulation and inflationary surprises. This view is consistent with the McKinnon and Shaw notion of financial repression (McKinnon (1973)). In particular it implies that financial repression is lower the higher CBI.

# 5. Determinants of Central Bank Independence

Why are the central banks of some countries more independent than those of other countries? Factors like historical accident and tradition no doubt play a role. But beyond such specific factors there may be systematic factors that operate more generally. Several hypotheses, some of them contradictory, have been proposed in the recent literature. Some of those have been tested empirically but the evidence is often inconclusive partly because of the smallness of samples and differences in the definition of variables used in different studies. This section briefly surveys recent hypotheses and empirical tests of the determinants of CBI.

## 5.1 Hypotheses about the Determinants of CBI

There are two classes of hypotheses concerning the determinants of CBI. One class of hypotheses is derived from strategic models of monetary policy in which dynamic inconsistency and the tradeoff between credibility and flexibility are basic clements.The other class of hypotheses is not as structured but wider in scope.

The first class of hypotheses implies that in general anything that raises the inflationary bias of monetary policy also raise the degree of independence that the political authorities desire to confer on the CB. Thus, *ceteris paribus,* factors like a strong emphasis on employment considerations, a strong response of employment to unexpected inflation and a large difference between the natural and the desired rate of unemployment raise the degree of independence conferred on the CB. The intuition is that the benefits of delegation are higher the higher the inflationary bias. Conversely, when the variance of productivity shocks is larger, the benefits of flexibility are higher and the degree of independence conferred on the Bank, therefore, lower.

An important element of the theory is that, at least in democracies, delegation of authority to the CB is used, by the party in office, as a device to restraint the challenging party from spending on activities that are not favored by the party in government. An implication of this point of view is that, provided political polarization is sufficiently large, higher political instability leads politicians to delegate more authority to the CB. Delegation is also used to reduce interest payments on the government debt. Since this effect is more important the larger government debt it would appear that a larger government debt should lead to more delegation. But on the other hand the temptation to inflate the debt away is stronger the larger the debt and this reduces the tendency of political authorities to grant CBI. The total effect is therefore ambiguous. Further details and discussion appear in Cukierman (1994a) and Eijffinger and Schaling (1995).

Theoretical hypotheses about the determinants of CBI within the second class span a large range of factors like the width of financial markets, the degree of effective opposition to inflation, the quest for international sources of funds and the collective memories of high past inflation. All those hypotheses should obviously be viewed as being specified with "other things the same". Cukierman (1992, ch. 23) hypothesizes that the wider are financial markets and the more elastic the supply of funds to government with respect to the interest rate, the more likely is the CB to be

independent. Posen (1993) conjectures that CBI is higher the stronger and the more effective the opposition of the financial sector to inflation. In addition he conjectures that this opposition is stronger, or better organized, in countries with universal banking and with smaller regulatory powers of the CB over the financial sector. Posen presents some evidence in support of this hypothesis. De Haan and Van't Hag (1994) examine the robustness of this evidence with respect to the measure of CBI and find that altough the signs of the coefficients are always in the hypothesized direction, they are significant in only one third of the cases examined.

While trying to explain the recent trend towards more legal independence Maxfield (1995) develops the hypothesis that CBI tends to follow the actual and the perceived, by political authorities, need for funds. When this need is high, government tries to signal the creditworthiness of the country by delegating more authority to the CB. This mechanism has a stronger impact on independence the more liquid are the international assets through which funds are intermediated, the less concentrated are international investors, the larger the effect of CBI on the supply of funds, the freer are capital flows, and the longer is the political horizon of domestic politicians.

Finally, countries that have experienced substantial reductions in real incomes during episodes of high, or of extremely high inflation, are more likely to impose constraints on the ability of politicians to tamper with monetary policy by delegating authority to the CB or by pegging the exchange rate.Three illustrations come to mind; Germany, Austria and Brazil. All three countries experienced substantially above average inflations during the twentieth century. In the first two cases this was accompanied by substantial reductions in real income. By contrast, real income in Brazil grew handsomely during a large fraction of the inflationary period. Both Germany and Austria (but not Bazil) have since instituted strong commitment devices. Germany by delegating a lot of authority to the CB and Austria by firmly pegging to the German Mark.

## 5.2 Empirical Evidence

Using data on industrial economies and alternative indices of legal independence de Haan and Van't Hag (1994) test some of the hypotheses reviewed in the previous subsection. They do not find

support for a positive relation between independence and the natural rate of unemployment[11] but this may be due to the fact that they do not control for possible cross country differences in the desired rate of unemployment. They find no significant effect of the debt to GDP ratio on independence which is consistent with the generally ambiguous prediction of theory. Contrary to theory, legal independence is often negatively related to political instability[12]. The most interesting result they report is that legal independence during the eighties is positively related to the level of inflation experienced between 1900 and 1940. This finding is consistent with the hypothesis that politicians in countries that have collective memories of high inflations are more likely to delegate authority to the CB. A possible interpretation of this result is that politicians in countries with a history of high inflation believe that the inflationary bias is higher and delegate, therefore, more authority to the CB. Interpreted in this manner, the finding supports the theory that CBI is larger the higher the **percieved** inflationary bias.

Eijffinger and Schaling (1995) report evidence of a positive relation between legal independence and the slope of the short run Phillips curve supporting their theory that the larger this slope, and therefore the temptation to inflate, the higher are the benefits of an independent CB.

Using a mixed sample of industrialized and of developing countries Cukierman and Webb (1995) investigate the effect of various types of political instability and of the level of development on the political vulnerability of the CB governor. They find that vulnerability is, *ceteris paribus*, higher in LDC's and that high level political instability (changes of regime-from democratic to authoritarian or vice-versa) has a positive, marginally significant effect on vulnerability. This finding is consistent with the view that when political instability involves fundamental changes in the political rules of the game implying that the party in power would not be back in office soon, if ever, political horizons become sufficiently short to induce politicians to fortify their grip on monetary policy rather than to delegate it to an independent authority.

---

[11]A similar finding is reported in Eijffinger and Schaling (1995).

[12]But Cukierman (1992, ch. 23) reports, for a limited sample of developing countries, that legal independence is negatively related only to **regime** instability and that it is positively related to **party** instability within a given regime.

# 6. Accountability and Optimal Contracts for Central Bankers

The recent trend towards the granting of higher legal independence has sharpened the differences between two basic philosophies underlying the institutional independence of central banks. The first takes the view that a way to reduce the inherent bias of monetary policy is to delegate authority to a 'conservative' central banker. Here 'conservative' is taken to mean that the CB assigns a relatively higher priority to price stability than society[13]. This concept is often reffered to as Rogoff's (1985) conservative central banker. The nearest real life counterpart of this model is probably the Bundesbank which not only has full control of monetary policy instruments but is also free to set its own numerical targets for monetary expansion .

The other view is that, in a democratic society, all policy making institutions including the CB must ultimately be accountable to the electorate. In practice this means that the CB is accountable to the democratically elected officials or even that monetary policy is under the direct authority of government. There are two versions of this point of view ; a more extreme and a less extreme version. The first one simply places the authority for monetary policy in the hands of a government agency, usually the Treasury. The Bank of England, the Banque de France until recently, and the Bank of Japan are real life examples of the first approach. In such cases the CB simply implements the daily policy decisions that are largely made by the Treasury. The second, milder, version directs the CB to achieve specific objectives (usually by specifying numerical targets for inflation) and holds the Bank accountable for their achievement. But the Bank has full authority over the conduct of

[13]More precisely the multiplicative weight on inflation is larger in the objective function of the conservative banker.

monetary policy unless it does not achieve the specified targets or is publicly overriden by government. In the words of Debelle and Fischer (1994) and Fischer (1994) the Bank has, in this case, 'instrument independence' but no 'goal independence'. The nearest real life counterpart of this model of independence is the 1989 Bank of New-Zealand law. This model of independence has also been recently proposed as a blueprint for reforming the charter of the Bank of England by an independent panel of experts under the banner of 'independent but accountable' (Roll Report (1993)).

Although the distinction between instrument and goal independence is useful it should be pointed out that, in a wider sense, there is no CB -not even the Bundesbank- that has full goal independence. In spite of the fact that it is free to choose its own nominal targets the Bundesbank is directed by law to focus on safeguarding the value of the currency and to elevate this objective above all other objectives implying that it does not have full goal independence. The ultimate determination of broad objectives even in the case of one of the most independent central banks is, thus, under the authority of legislators. It would therefore seem that a more practical distinction is between **narrow** goal independence and **broad** goal independence. No existing CB possesses broad goal independence since those goals are invariably specified by legislators. The Bundesbank possesses narrow goal independence and the Bank of New-Zealand has **partial** goal independence[14].

## 6.1 Optimal Contracts for Central Bankers

Unlike the bulk of this survey which focusses on positive issues the discussion in this subsection is directed at the following normative question : How to devise monetary policy making institutions in an optimal manner? The discussion pressuposes the existence and knowledge of a social welfare function that is used as a benchmark to evaluate alternative institutional arrangements. This function assigns positive weights to output stabilization and to the stabilization of inflation around a zero or relatively low value.

Delegation of authority to a Rogoff conservative central banker reduces the inflationary bias of policy at the cost of higher than optimal output variability. The reason is that, since it puts a lower

[14]The Bank of New-Zealand has a limited degree of narrow goal independence since the fixing of inflation targets is done by the Finance Minister in **agreement** with the governor of the CB (Walsh (1995b), p. 157).

weight than society on output stabilization, the conservative central banker is characterized by a degree of activism that is lower than the degree of activism required to achieve a social optimum. Simple escape clauses, like constant low inflation for small supply shocks, and discretionary policy for large shocks, have been examined by Flood and Isard (1989), Obstfeld (1991) and Lohmann (1992). In particular Lohmann's framework calls for the appointment of a Rogoff type central banker that can be overriden by government when supply shocks exceed some threshold. In equilibrium, the CB is never overriden- not even when shock realizations are above the threshold- since the CB, knowing that it will be overriden if it does not comply, prefers to accomodate the wishes of government in such cases. This institutional arrangement dominates the simple conservative CB arrangement but falls short of the level of welfare that would have been achieved by a benevolent social planner. Some tradeoff between credibility (elimination of the inflationary bias) and flexibility (stabilization of real shocks to output) remains.

A CB institutional arrangement or 'contract' that achieves the social optimum, thus eliminating the tradeoff between credibility and flexibility, has recently been proposed by Walsh (1995) and extended by Persson and Tabellini (1993). The optimal contract is an application of ideas from the principal-agent literature. In this application government is viewed as the principal and the CB as the agent. The principal (government) signs a contract with the agent (the central bank) according to which the Bank is subject to an expost penalty schedule that is linear in inflation. A nice feature of this type of incentive contract is that it achieves the social optimum independently of whether or not government and the bank share the same objective function and the same information[15]. The optimal contract is thus strongly reminiscent of recent implementations of inflation targeting methods in New-Zealand, Canada, the UK and several other countries[16].

The optimal contract approach to the design of monetary institutions is a natural theoretical vehicle for the formalization of the wider idea of accountability discussed earlier. However, there are several issues that have to be addressed before such optimal contracts can be implemented in practice.

---

[15]For the simple Barro Gordon (1983) framework the parameters of the optimal contract are not state contingent. But this is not likely to be the case in more realistic environments (Persson and Tabellini (1993), Walsh (1995b)).

[16]A fuller discussion of inflation targets appears in the next section.

The first and main difficulty is that, altough they perform a useful function as benchmarks, social planners do not exist in practice. Hence government has to be relied upon to impose the optimal incentive schedule on the CB expost. Is it realistic to assume that government can be relied upon to do that? I believe that in the abscence of additional safeguards the answer is no. Governments and legislatures are also subject to an inflationary bias and usually to a greater extent than the CB. The constant threats to Federal Reserve independence mounted by Senator Paul Sarbanes and Representative Henry Gonzales, among others, in order to obtain lower interest rates attest to that. Similar mechanisms operate in other countries as well. McCallum (1995) and Walsh (1995b) himself recognize that if government cannot commit to the optimal penalty schedule **before** various types of nominal contracts are concluded the optimal CB contract will not be credible[17]. This then shifts the focus to the question of how to commit government to implement the contract expost. This is largely an open question. But it is likely that the presence of legislation which requires government to publicly explain its actions whenever it deviates from the expost implementation of the contract may at least partially commit government to the expost application of the contract. A requirement of this type that requires government to go public when it overrides the CB appears in the recent Bank of New-Zealand legislation. Another practical difficulty is that the design of an optimal contract requires advance knowledge of the preferences of the central banker to be appointed. This is hardly likely to be the case in practice as illustrated by the work of Havrilesky (1991).

## 6.2 Central Bankers with Conservative Desired Inflation

One of the advantages of delegation of authority a la Rogoff is that it is not necessary to rely on the political principals for the implementation of the optimal contract expost. But,as we saw, Rogoff's proposal has the drawback that it does not achieve the optimal level of welfare[18]. Svensson (1995) has recently shown, within the conventional framework, that when the objective

[17]Even the experts responsible for the Roll Report (1993) in the UK came down in favor of having the CB set its own targets, largely on the ground of the potential time inconsistency of politicians (Goodhart and Vinals (1994)). See also Cukierman (1994b) p.1444.

[18]Here the optimal level is defined as the level of welfare achieved by a benevolent social planner with full commitment ability.

function of the central banker differs from that of society with respect to desired inflation (rather than with respect to the relative (multiplicative) preference for price stability) delegation of authority to a central banker with the 'right' desired inflation level or target achieves the same result as the optimal contract[19].

This implies that the socially optimal level of welfare can be achieved through delegation of authority to a central banker with a suitable desired level of inflation rather than via an incentive contract for the bank. The big advantage of the first institution is that it does not have to rely on the expost implementation of the optimal contract by inflation bias ridden governments. It would appear, therefore, that Svensson's result implies that it is possible to reach the social optimum simply by delegating authority to an appropriately chosen type of central banker. A practical difficulty, that may prevent the implementation of such an institution, is that the political principals may not be able to identify exante the desired levels of inflation of potential candidates for the CB. Svensson suggests that this problem may be circumvented by giving the Bank only instrument independence, but not goal independence, so that the target or 'desired' rate of inflation in the Bank's loss function is mandated by government. But under such circumstances government may, again, be tempted not to impose this institutional goal on the Bank expost. This risk may be reduced by having a **public** multi-year agreement between government and the CB about a quantitative inflation target and perhaps by appointing an independent board to evaluate the performance of the CB.

## 6.3 Concluding Reflections

A basic implicit premise of the literature surveyed in this section is that stabilization of real shocks to employment and output has to be performed by monetary policy. An obvious alternative is fiscal policy. This raises an important question regarding the optimal allocation of these policy instruments between stabilization of the economy and other objectives. Utilization of fiscal rather than of monetary policy for anticyclical purposes has several advantages. First, provided the CB is

[19]The conventional framework involves a quadratic loss function and serially uncorrelated real shocks. In the case of serially correlated shocks implementation of the optimal rule can be achieved with a state contingent optimal inflation target through delegation to a Rogoff's 'weight conservative' CB.

sufficiently independent fiscal policy is shielded from possible inflationary biases. Second, fiscal policy can be decomposed into a multitude of specific types of expenditures and of taxes. As a consequence it can be applied in a more differentiated and focussed manner than monetary policy. Being more explicit than monetary policy it is also more subject to public scrutiny and control.

It is well accepted that in the long run monetary policy can achieve only price stability. The assignement of additional, short run, objectives like stabilization policy to the CB requires more complicated "contracts" in which the scope for suboptimal inflationary temptations is greater. Leaving the stabilization of the economy to fiscal policy and requiring the CB to focus on price stability reduces this risk. A common counter argument is that the effects of monetary policy on the economy are swifter than those of fiscal policy. There obviously are some tradeoffs here and it is likely that an optimal allocation of instruments will involve some stabilization by **both** instruments. My personal gut feeling is that the burden of anticyclical policy should be put mainly if not solely on fiscal policy. The issue clearly deserves more consideration than what has, hitherto, been given to it.

# 7. Nominal Targets[20]

The recent wholesale trend towards upgrading of CBI has stimulated the interest of policymakers in the old idea of nominal targeting. The reason is probably related to the fact that,once they delegate authority to an autonomous institution, politicians feel that the objectives of this institution need to be specified explicitly[21]. Targets are preannounced for two related reasons. First to, at least partially, commit policymakers to a particular path or range for monetary policy and second in order to influence inflationary expectations, and therefore nominal contracts, early on.

During the seventies and the eighties a number of countries such as the US, Germany, Switzerland and France have preannounced monetary targets. In the early nineties, several countries like New-Zealand, Canada, the UK, Sweden and Finland introduced inflation targets. Some of those,

[20]A fuller, largely informal, discussion of nominal targets appears in Cukierman (1995c).

[21]Goodhart and Vinals (1994,p. 29) state that a subservient CB does not need a target since it will be carrying out the wishes of its political masters.

as well as the members of the EMS have used exchange rate targets or fixed pegs.
The common aim of all these arrangements is to provide a 'nominal anchor" for monetary policy by subjugating it to the achievement of a preannounced target. In practice preannounced targets were often missed but this does not imply that policymakers made no effort to achieve them or that they were useless.

Targets help galvanize and coordinate the anti-inflationary forces within the public sector and outside it around a specific numerical value thus strenghtening the commitment to price stability. This point of view is consistent with empirical evidence showing that, other things the same, rates of inflation in countries that had monetary targets were lower (Cukierman (1992),table 20.4). But the credibility of preannounced targets ultimately depends on their record. Policymakers earn the ability to substantially impact expectations merely by announcing targets only after they have demonstrated this ability for a sufficient lenght of time.

Three types of targets, or of nominal anchors, have been used in practice. Exchange rate targets, monetary targets (ranging from narrower to wider definitions of money), and more recently inflation targets[22]. A list of industrial countries currently using each type of target appears in table 3 of Goodhart and Vinals (1994). Two related questions arise with respect to those alternative methods, one normative and one positive. The first question is what targeting method is appropriate for which country? The second, positive question, is why have the targeting methods actually used in the past been chosen?

There are substantial variations in the identity of the institution making the announcement and in its 'firmness' across countries. Exchange rate targets are usually decided upon and announced by government with or without the participation of the CB. The CB appears to be involved relatively more often in the case of inflation targets but their preannouncement is often made jointly with government. But even when government sets targets alone the CB is involved in their implementation. The relative involvment of the CB in both determining and announcing the target

[22]GNP targeting is occasionally mentionned as a fourth possible method, particularly in the US. However, as far as I know it remains in the realm of academic discussions. Some of the practical difficulties with GNP targeting is that GNP cannot be targeted on a monthly (or finer) basis since data on it is quarterly at best and becomes available with a relatvely long lag.

is greatest in the case of monetary targets but there are variations even across the countries that had or have monetary targets. The firmness of the announcement varies from a mere forecast as in Japan to an explicit commitment to use policy in order to correct deviations from the announced course as is currently the case in New--Zealand.

## 7.1 What is a good Target?

A basic question underlying any normative discussion of targetry is what are the properties of a good target? The ideal target should probably be easy to control, highly visible (or transparent) to the public, observable at short intervals and should not interfere with the achievement of other economic goals. Provided there are sufficient exchange rate reserves or if monetary policy is subordinated to its achievement an exchange rate target satisfies the first condition. As stressed by Melitz (1988) and Bruno (1993) it is also highly visible and observable on a daily basis. Its main drawback is that it may lead, in some cases, to an overvaluation of the currency and a consequent loss of competitiveness. This is particularly likely to be the case in small, relatively open economies, whose domestic financial assets are not perfect substitutes to foreign financial assets. In such economies it is possible to raise the money supply while maintaining a fixed peg, at least for a while, by means of sterilized interventions[23]. In those cases policymakers are tempted to use monetary expansion to achieve domestic objectives while relying on sterilized interventions to maintain their commitment to the peg. This combination of policies eventually leads to a nominal devaluation. But until this happens the real exchange rate may be overvalued.

Base targeting has the important advantage that it is, at least in principle, fully controllable by the CB. But it is less visible than either an exchange rate target or an inflation target. Hence its effect on inflationary expectations may be restricted to individuals who have sufficient familiarity with financial and monetary matters. Controllability is likely to be smaller the wider the monetary stock that is being targeted. Even if it is not available on a daily basis data on the monetary base can be obtained, at least by the CB, with reasonably high frequency. Base targeting does not create

[23]A precise description of the mechanics of this process appears in the theoretical part of Cukierman, Rodriguez and Webb (1995).

temptations to engage in non sustainable policies, as is the case with an exchange rate peg. But it may interfere with anticyclical monetary policy unless an optimal and credible CB contract of the type discussed in the previous section is in place.

Being focussed on the main final objective of monetary policy inflation targets have an important visibility advantage over monetary targets since inflation and the price level are widely understood concepts. In most countries data on inflation is available at one month intervals which is likely to be sufficient as long as the rate of inflation is moderate. Provided an optimal CB contract can be implemented an inflation target need not interfere with anticyclical monetary policy. But,due to long and variable lags between money and prices as well as to shocks to the real economy, the CB does not have perfect control of inflation. Thus the choice between inflation and base targets involves a tradeoff between visibility and controllability. A discussion of the implications of this tadeoff appears in subsection 7.4 below.

## 7.2 Positive Aspects of Targets' Choice

I briefly turn now to positive aspects of the choice between alternative targeting procedures. In particular why do some countries use one target and other use a different one and why does the choice of target sometimes change over time?

Exchange rate pegs are usually used in small, relatively open economies. Such countries often peg to the currency of a major trading partner provided this currency is relatively stable. Austria, Belgium and the Netherlands that peg to the Mark are examples. Fixed pegs are also used during and following the stabilization of inflation when credibility is relatively low. But after a while there is a tendency to flexibilize the exchange rate (Cukierman, Kiguel and Leiderman (1994?)). Argentina, Mexico, Israel and Chile are examples. A possible theoretical explanation for why policymakers with low credibility prefer fixed pegs to inflation targets cum flexible rates is proposed by Herrendorf (1995). The argument is that since the exchange rate is more visible and more controllable than the rate of inflation, policymakers find it more costly to deviate from an exchange rate target than from an inflation rate target.. As a result the disciplinary effect of an exchange rate target is stronger making it easier for serious policymakers with little reputation to signal their commitment to price stability.

Countries that have opted for either monetary or inflation targets are usually not so open. They often have flexible exchange rates or at least relatively more flexible rates and are more likely to have relatively wide financial markets. The US, Japan, Germany, and the UK are examples. Further details can be found in Goodhart and Vinals (1994) and in Cukierman, Rodriguez and Webb (1995).

## 7.3 Inflation Versus Monetary Targets

Financial innovations and the consequent breakdown of traditional regularities between money and nominal income reduced the ability of monetary authorities to control inflation and with it the meaning of monetary targets for short run inflation control. This led countries like Canada, New-Zealand, the UK, Sweden, Italy and Israel to the recent adoption of inflation targets. Details on the experience of these and other countries that use some form of inflation targeting procedure appear in Leiderman and Svensson (1995).

Despite success in attaining preannounced targets in New-Zealand, Canada and the UK, bond yields suggest that long term inflationary expectations persistently exceeded long term targets throughout the first years after the introduction of inflation targets (Ammer and Freeman (1994)). This does not necessarily imply that the preannouncement of targets had no impact on expectations. But it does imply that in the presence of imperfect reputation this impact is partial and that high reputation for price stability is established only after a persistent record of low inflation[24].

As noted above the choice between inflation targets and monetary targets involves a tradeoff between visibility and controllability. This tradeoff is most notable when the monetary target is high powered money since this is a nominal stock that can be tightly controlled by the CB. What is the differential effect of those two targeting methods on expectations and on the expected value of policy objectives? Cukierman (1995a) provides a systematic analysis of these questions in a framework of private information about the dependability of policymaker. Under base targeting dependable policymakers can demonstrate their dependability relatively quickly. Since the base is perfectly

[24]This is consistent with theory which implies that in the presence of imperfect reputation the impact of announcements on inflationary expectations is partial (Cukierman and Liviatan (1991) and chapter 16 of Cukierman (1992)).

controllable any deviation from the preannounced path is immediatly recognizable as due to lack of dependability. By contrast, since the controllability of inflation is imperfect it is more difficult for the public to quickly separate between dependable and non dependable policymakers.

Thus, a dependable central banker can establish his dependability relatively more quickly under base targeting than under inflation targeting provided the **same** number of individuals pay attention to both types of announcements. On the other hand, since inflation targets are more visible to the general public than base targets, less people pay attention to the latter target making the immediate impact of base announcements on the **average** inflationary expectation of the public smaller. The analysis reveals that inflation targets dominate base targets when reputation is high and policymakers are sufficiently patient. Not surprisingly the relative advantage of base targets increases with their visibility, and subject to some conditions, the lower is the controllability of inflation.

Beyond that, inflation targets have the virtue of being focussed on the final objective of interest. This is particularly important when the relation between money and prices is relatively unstable. But inflation targets make it easier to exert expansionary pressures on the CB in order to reduce interest rates and achieve various real objectives. Such pressures are particularly likely to materialize in periods in which the inflation target is attained. Further discussion of these issues appears in Cukierman (1995b).

An issue that got some attention recently, within the context of inflation targets, is whether one should aim at a price level target or at an inflation rate target. In the first case a period of higher than normal inflation would have to be followed by a period of lower than normal inflation. In the second case there is no attempt to undo past misses. Under an inflation target, if actual inflation in the last period was higher than the target there is no attempt to compensate for that in the current period. Thus, with an inflation target uncertainty about the long run price level is larger but there is more certainty about the rate of inflation than with a price level target regime.

## 7.4 Who Should Announce Targets?

The specific question here is the following: Given that a particular target is used who should announce it? Government, the CB or both? In general the institution that has authority over the target under consideration should announce. Thus if there is a monetary target and the CB has full

authority over monetary policy the CB should make the announcement. If government has authority over monetary policy government should announce. If authority over the announced target is shared a joint announcement is preferable. For example if there is an exchange rate target in place, and government as well as the CB can affect it, the announcement should be made by both institutions.

# 8. Price Stability, Financial Stability and the Supervision of Financial Institutions

A traditional function of central banks is to act as lenders of last resort in order to safeguard the stability of the financial system. A related activity is prudential regulation and supervision of financial institutions. In some countries those functions are performed by the CB and in other by separate regulatory bodies. A detailed factual description of the allocation of those responsibilities across institutions in various countries appears in Goodhart and Shoenmaker (1993). The recent reorientation of CB laws towards more focus on price stability raises two related questions : First, is there a tradeoff between price stability and financial stability? Second, should supervision and regulation of the financial system be performed by the CB or by a separate authority? The following two subsections address those questions.

## 8.1 Is There a Tradeoff Between Price Stability and Financial Stability?

Baltensperger (1993) argues persuasively that in the long run price stability is conducive to financial stability. Financial crises are often caused by unstable inflation and interest rates that induce large fluctuations in the asset values of financial institutions. Stable prices reduce this risk by dampening fluctuations in inflation and interest rates, and therefore in the real value of the portofolio of financial institutions.

But there may be a short run tradeoff between price stability and financial stability that is due to the fact that bank loan rates are normally more sticky than bank deposit rates. As a consequence when interest rates rise unexpectedly bank's profits are sqeezed since the increase in deposit rates is, temporarily, larger than the increase in the stickier loan rates. In such circumstances marginal banks may experience liquidity problems forcing the CB to de-emphasize its price stability objective, at least

temporarily, in order to perform its lender of last resort function.

But as explained in chapter 7 of Cukierman (1992), if interest rates fluctuate randomly around some long run value, this tradeoff is temporary. The reason is that when interest rates unexpectedly go down the same mechanism raises the liquidity of banks allowing the CB to mop up the liquidity created when interest rates went up, without endangering financial stability. Hence if the CB is directed to maintain a low average growth rate of liquidity, but to raise it above the average in periods of liquidity squeezes and to reduce it below the average in the remaining periods, the tradeoff between price stability and financial stability can be avoided even in the short run. This argument is predicated on the presumption that effective safeguards against base drift are available. In the absence of such safeguards liquidity crises, particularly if they are large, may jeopardize price stability.

## 8.2 Should the Central Bank Supervise the Financial System?

The location of the supervisory function varies across countries and there appears to be no clear cut relation between its location and the performance of the economy (Goodhart and Shoenmaker (1993)). There is some evidence pointing to the possibility that the rate of inflation is lower in countries whose central banks are not charged with supervisory responsibilities (Downes and Vaez-Zadeh (1991)) but the sample is small and the direction of causality not clear. The issue clearly deserves further work. It seems therefore that, in the absence of clear evidence, the case for or against placing supervision , deposit insurance and other regulatory functions under the authority of the CB has to be judged mostly on the basis of apriori considerations.

What are the advantages and drawbacks of placing supervision and related functions under the authority of the CB? One advantage is that the CB can utilize micro information generated for supervision purposes to improve the conduct of aggregate monetary policy and vice versa. In addition it is likely that there are strong complementarities between the type of personnel needed for supervision and for the conduct of monetary policy. A sufficiently independent CB is more likely to apply purely professional considerations in supervisory functions,including bailouts of insolvent banks, than would an institution closer to the political establishement (Bruno (1994)).

On the other hand placing supervision in the CB makes the bank more vulnerable to political pressure. In the presence of large scale bank failures there is a higher risk that bad debts will be

monetized when supervision is in the hands of the CB. By the same token when supervision is performed by a separate institution the budgetary implications of rescue operations are likely to be more transparent facilitating democratic control. Those considerations are particularly important in LDC's. But a possible drawback of separate authorities is that financial crises are not going to be recognized and handled as swiftly as would have been the case when the CB is responsible for both functions. This suggests that the basic tradeoff here is between the risk of excess monetization on one hand and the risk of a slow response to financial crises on the other. Further discussion of the pros and cons of placing supervision in the CB appears in the Roll (1993) report for reforming the Bank of England. Additional remarks on this issue, in the context of former socialist economies, appear in section 9.2 below.

# 9. New Central Banks in Former Socialist Economies

During the first part of the nineties practically all former socialist economies (FSE) established new central banks whose charters borrow many features from the CB charters of industrial democracies. In some cases those charters incorporate essential features of the charter of highly independent Western central banks like the Bundesbank[25]. This trend is part of the wider effort made by those countries to restructure institutions so as to transform them from centrally planned economies (CPE) to market economies. Under socialism there normally was only one bank, the so called Monobank, that functioned as an economy wide clearing house which administered the transactions counterpart of the central plan and was responsible for the issue of cash and notes. The Monobank was also widely used to channel subsidized credits to sectors and enterprises in line with government wishes. This often led to situations in which enterprises could accumulate unpaid debt or negative net worth without fear of default, a condition commonly reffered to as "soft budget constraints".

[25]This is the case, for example, in Bulgaria, the Czech Republic, Hungary, Slovenia and Slovakia. As in the charter of the Bundesbank price stability is the prime legal objective of the CB and there are strict limitations on lending to government (Hochreiter (1994)). A preliminary systematic listing of some detailed features of the charters of new central banks in the FSE appears in Hinton-Braaten (1994).

The first step in the creation of new central banks in the FSE was to establish a "two tiers banking system" meaning that the Monobank was broken into several banks one of which became the new CB and the rest became regular banks that were supposed to engage in normal banking business. Altough this is a non negligible institutional change it is appropriate to keep in mind that this is only one change within a whole package of institutional reforms the most important of which were privatization, lifting of price controls, freeing of trade flows, the establishement of new tax systems and the establishement of legal structures that clearly define and safeguard private property. One desirable, but individually inconvenient, consequence of those reforms is the hardening of soft budget constraints.

The establishement of a two tier banking system was usually one of the first reforms to be implemented. Two main problems confronted the newly created central banks almost immediately. First, some of the other reforms like price liberalization, initial devaluations (to correct for overvalued currencies) and tax reform produced one time, but sizable, upward shocks to the price level, triggering substantial pressures for monetary accomodation of those shocks. Second, the newly created CB had to create the instruments and the expertise necessary to supervise the newly created banking system practically from scratch. Due to little experience with the evaluation of loan risks in a market economy, and the past legacy of arrears and non performing loans, the buildup of an effective supervisory capacity was essential if financial crises were to be avoided. Beyond those two functions that traditionally are within the realm of its authority, the CB was often (and still is) called upon to participate in decisions or advise on wider issues concerning the transition to a market economy. Examples are the sequencing of reforms and the setting of the exchange rate.

## 9.1 The Fiscal Stance, CBI and Inflation

The political, economic and social problems associated with transition are often conducive to substantial budget deficits. As illustrated by recent events in the Russian Federation legal independence of the CB alone cannot assure price stability in such cases. Capital markets in most of the FSE are narrow, severely limiting government's ability to finance deficits by floating debt. As a consequence deficits are financed mostly by seignorage, fueling inflation. Under such conditions legal limitations on lending to government and other legal provisions that fortify the legal status of the CB

do not suffice to check the tide of inflationary finance. It would appear therefore that unless government is able to balance the budget, or at least to keep deficits small, high inflation will continue even if the CB has a relatively high degree of legal independence.

Two polar cases illustrate this general principle. Already during the first stage of transition the Czech Republic established budgetary balance and stuck to it while the Russian Federation ran high and persistent budgetary deficits. Correspondingly the rate of inflation in the Czech Republic was one of the lowest among FSE while inflation in the Russian Federation was one of the highest (further details about the Czech and Russian conditions appear in Tosovsky (1994) and Popov (1994) respectively). Altough the matter was not researched systematically my impression is that the central banks of both countries enjoy a reasonable degree of **legal** independence altough the charter of the Czech Republic may reflect a somewhat higher degree of legal independence.

More generally there is reason to believe that legal independence of the CB in the FSE is substantially less effective as a commitment to price stability than in the industrialized economies for several reasons. First, the extent to which legal independence is translated into actual independence depends on the general respect towards the rule of law in a country. As forcefully argued by Triska (1994) this public good was largely destroyed under socialism. One may redraw the CB law quickly but its application depends on tradition and the norms of society. Since those features change relatively slowly the correlation between legal and actual independence in the FSE is likely to be smaller than in the industrialized countries. Second, there is evidence that the divergence between actual and legal terms in office of the CB governor is significantly higher in developing countries than in the industrial democracies (Pal (1993)). Finally, when a country undergoes fundamental restructuring of institutions the magnitude of unanticipated shocks and the temptations to bend the law is larger than in normal times. An illustration of this general principle is the finding that the governor of the CB is much more likely to be sacked (in spite of the law) after a change in regime than after a regular political change which does not involve a change in the basic rules of the game (Cukierman and Webb(1995)).

On the other hand during periods of large shocks and fundamental restructuring, of the type experienced by economies in transition, politicians are more likely to turn to professional advice and to involve the CB in a wider range of decisions than is the case in normal times. In some of the FSE

the CB is **the** economic advisor to government and in others it is deeply involved in setting exchange rate policy. As stressed by Bruno (1994) the actual influence of the CB, in its capacity as advisor, may be enhanced if the CB possesses a good professional staff in comparison to other branches of government. This contrasts with the industrial countries in which the CB does not possess those functions, at least not formally.

## 9.2 New Central Banks as Supervisors of the Financial System

The tension between price stability and financial stability raises the previously discussed question about whether the responsibility for both objectives should be assigned to the CB or whether regulatory and supervisory functions should be delegated to a separate agency. A general discussion of the merits and dangers of each of those institutional arrangements appears in the previous section and will not be replicated here. But some additional considerations arising from the particular conditions of economies in transition will be briefly mentionned. A typical legacy from the past in FSE is the relatively large size of non performing or bad loans owned by the banking system. When the CB is responsible for financial stability the temptation to utilize monetary expansion in order to bail out insolvent banks and to avoid financial crises is likely to be stronger. This is due to the divided responsibilities of the CB as well as to the fact that political pressures on the bank to come to the rescue are stronger. This danger is particularly relevant in the FSE because of the large size of bad loans and is likely to be larger the larger the fraction of banks that remain under direct government ownership.

Another drawback is that with joint responsibility for both functions at the CB it is easier to disguise rescue operations and favoritism thus evading democratic control over public expenditures. A common channel in the FSE is directed credits at subsidized real rates. In the presence of inflation the subsidy component of such loans is an increasing function of the rate of inflation. In addition, since the rate of inflation is uncertain, the size of the subsidy is hard to predict in advance.

An advantage of joint responsibility, is that it makes it possible to utilize the specialized skills needed for supervision and monetary policy in a more effective manner.. This advantage is more important in FSE in which those specialized skills are relatively scarce. A fuller discussion of the pros and cons of placing supervision in the hands of the CB in the context of FSE appears in Rimshevichs

(1994).

Beyond the question regarding the institutional location of supervision and regulation of the financial system lurks the wider tradeoff between encouraging the development of private financial institutions, particularly of banks, and assuring that those institutions operate in a sound manner. This problem is largely specific to the FSE since they have to build the financial system practically from scratch. The problem is to strike a reaonable balance between those two objectives. (Some of the considerations involved appear in Udell and Wachtel (1994)). It is likely that, whether or not they are formally charged with supervisory tasks, the central banks of FSE will have to keep this tradeoff in mind when making decisions about monetary policy.

## 9.3 The Central Bank of Russia and Russian Inflation

The recent high Russian inflation is taken, by some casual observers, as a contradiction to the commonly held view that CBI and inflation are negatively related. The claim is that, in spite of the fact that the Central Bank of Russia (CBR) is legally independent from the central government, the rate of inflation in Russia is high and persistent. Moreover the CBR is on record for stating that the sources of the Russian inflation are non monetary. Instead, factors like monopolistic pricing, deregulation and other barriers to the flow of resources are mentionned by the Bank as the main reason for inflation. Interestingly, it was the reform minded Finance Minister- Fyodorov- who argued in 1993 that the source of inflation is monetary and put the responsibility for monetary expansion through cheap credits squarely on the CB and its governor (Popov(1994)). It would appear therefore that in the Russian case the CB used its independence to fuel inflation wheras the Finance Minister who is normally believed to be more expansionary argued as if he was a "Rogoff conservative central banker" putting a basic presumption of the strategic approach to monetary policy on its head.

What should we make of this interpretation of events in Russia? I believe it grossly exagerates the independence of the CBR, according to the by now standard definition, that the CB is independent if it has the mandate and the ability to focus single mindedly on the attainment of price stability. This is based on several observations. First, during 1992 and 1993 the Russian government borrowed large amounts from the CB at a nominal rate of ten percent per year (Popov(1994)). Inflation rates

during those two years were 1353 percent and 896 percent respectively[26]. This is highly inconsistent with the behavior of an independent CB. Second, altough it is legally independent from the central government the CBR is answerable to parliament whose members probably act as the representatives of various loan hungry constituencies. Aizenman (1992) has shown that in such cases there is a free rider problem that leads to an inflationary bias which rises with the number of different factions within parliament. The behavior of the Russian CB is thus consistent with the view that it acts largely as a proxy of parliament. Inflation is high because parliament represents many constituencies and because the CBR is **highly dependent on parliament** rather than being independent.

This recent Russian episode is reminiscent of an historical event from the more distant post World War I German hyperinflation. In mid 1922, at the insistence of the allies, the Reichsbank (the German CB at the time) was made more independent from government by increasing the fraction of non government members on the board of directors of the CB. In spite of this change there was no noticable change in the rate at which the Reichsbank discounted bills. But the composition of bills discounted changed. Till the change only treasury bills were discounted by the Reichsbank. After it **both** treasury and private bills were discounted. Rather than trying to stop hyperinflation the newly appointed members on the CB board (industrialists and bankers) assured that their constituencies would also get a share of seignorage revenues (Holtfrerich (1986), p. 186 and Cukierman (1988), p. 61).

Both of those episodes are consistent with the view that CBI can function reasonably well as a preventive but not as a remedial device. Once inflation has been allowed to develop, raising the legal independence of the CB without complementary measures, is unlikely to stop inflation (Cukierman (1992), p. 449).

# 10. The European Central Bank and the Political

[26]It is worth pointing out that the CBR of Russia was generally very slow in adjusting its lending rate to inflation. As a consequence whoever was lucky enough to get a loan from the CB obtained a subsidy that amounted to a large fraction of the loan.
a subsidy that amonted to a large fraction of the loan.

# Economy of Monetary Union

The charter of the European Central Bank (ECB) as laid down in the Treaty of Maastricht is patterned after that of the Bundesbank. The primary goal of the Bank is to maintain price stability. Without prejudice to this objective, the Bank is also supposed to support the general economic policies of the Community. In order to make the Bank capable of achieving this task the Treaty endows it with a lot of legal independence. The charter grants to the ECB instrument as well as narrow goal independence and strongly protects it from pressures to lend to member governments[27].

In spite of the fact that the Treaty envisages a monetary union no later than by the end of this century large uncertainties currently loom over the creation of a union for several reasons. First, it is likely that a good number of countries in the EEC will not be able to abide by the Maastricht convergence criteria before the turn of the century. Second, as the time frame for the implementation of a union shrinks the general public in several countries gets more involved in the issue and more skeptical about the desirability of a union. Those trends and the traditional reluctance of the UK to join led to the idea of a two speed union which would include initially Germany, France and countries like Austria, the Netherlands and Belgium that maintain unilateral pegs with the DM. But the prospects for even such a smaller union recently dimmed as popular opposition to it in Germany increased[28]. In the absence of Germany, the "anchor country" a union appears to be pointless.

Assuming that the single market and unrestricted capital flows are here to stay autonomous monetary policies cannot coexist with fixed exchange rates in the long run (Padoa-Schioppa (1994)). It is therefore likely that a European Monetary Union (EMU) will ultimately come into being in the very long run in spite of the currently mounting opposition to it. But this may very well occur substantially after the beginning of the next century. This raises two problems for the proponents of a union. First, how to create the political consensus needed to create it. Second, if a union comes into being, how should its institutions be structured? Those questions are briefly discussed in the following two subsections.

---

[27]Details appear on pp. 148-182 of the Treaty on European Union (1992).

[28]Recent polls show that a majority of the German public is opposed to a union.

## 10.1 Bargaining Over the Form of Monetary Union

EMU was originally launched at least as much for political reasons as for economic reasons. Early visionaries of the union were, and probably still are, ultimately aiming at European **political** unification. Within such a broad program monetary union (MU) appeared as a relatively easy to implement first step. But subsequent events demonstrated that the political difficulties on the road to MU have been underestimated. The basic problem is that Germany and the countries in the hard core DM circle are relatively less willing to take risks on jeopardizing price stability in order to engage in stabilization policy. As a consequence there are natural disagreements about the future form of EMU. The Germans would like to have a highly independent ECB that would extend the modus operandi of the Bundesbank and of the German financial system to the entire union. They also insist on strict abidance to the Maastricht convergence criteria. Other countries like France view the union as a way to appropriate some of the credibility of the Bundesbank. But, at the same time, they want to retain more flexibility to engage in stabilization policy and are not too keen on giving up some of their financial and monetary institutions.

There is little doubt that Germany has a strong bargaining position in any negotiations that may lead to the ultimate formation of a European Monetary Union for two reasons. First because of its obvious dominant position in Europe. Second, it demonstrated the ability to provide a stable nominal anchor for other countries during the EMS era and after. It thus provided a public good to the other countries in the EEC. If Germany yields too much in current and future negotiations concerning the degree of flexibility allowed to the ECB this public good may be damaged[29]. The German bargaining position is strenghened even further by the fact that this is common knowledge.

An important question, therefore, is what are the incentives of Germany to join a monetary union whose institutional structure does not quite live up to the standards of the Bundesbank. An important economic advantage in joining such a union, is that it eliminates the ability of other countries to use competitive devaluations against Germany. As noted above there is also the political advantage, common to all countries including Germany, that MU may provide a jumping board for

[29]A more detailed discussion appears in Meltzer (1995).

political union[30].

## 10.2 How Should EMU be Structured - Open Issues

The Treaty of Maastricht provides the fundamental "constitution" for the ECB. But it leaves many open issues that will have to be settled if and when a union is formed. Some of the open issues are being examined by the recently founded European Monetary Institute (EMI). There is, in general, a basic tradeoff between advance detailed planning and retainment of the flexibility needed to adapt to unforeseen developments. This tradeoff is particularly important when a fundamental structural change like the formation of a monetary union takes place. Such a change gives rise to many imponderables making the ability to react to unforeseen developments highly valuable. On the other hand some basic institutional devices that set up the rules of the game for financial markets as well as for policymakers must be put into place in order to avoid chaos. Striking the right balance between those two needs is not easy and some errors are probably inevitable. Flexible advance planning that involves the preparation of several contingencies is likely to reduce the size of errors as well as their probability.

When several different fiscal authorities have access to CB credit each of them internalizes only a fraction of the effect that its own credit has on the general rate of inflation of the union (Aizenman (1992)). Being aware of this danger the drafters of the charter of the ECB prespecified rules for the distribution of seignorage in advance. Even with those safeguards in place the ECB could engage in cross country redistributive policies by concentrating its open market operations on the public debt of particular countries. As with direct seignorage this opens the door to lobying and political influence. However the institutional solution to this problem is not clear cut. Obviously it is always possible to mandate that any open market sale or purchase will contain prespecified proportions of the public debt of member countries. On the other hand this would curtail the freedom of the Bank to use its main policy instrument in a way that is tuned to short term developments in the money markets. It is likely that finding the appropriate institution may require

[30]Further discussion appears in section 7 of Cukierman (1995b).

some experimentation and that the optimal structure will require some discretion.

An important open issue is how to organize the transition to monetary union and to assure that the ECB inherits most, if not all, of the accumulated credibility of the Bundesbank already at the outset. Maintaining the credibility of the Bundesbank through the transition is in the long run a more efficient strategy than seriously damaging it and then having to rebuild it over a long period of time.

It is very probable that if a union is created before the turn of the century it will include only a subset of countries from the EEC. This raises an important question about the way to limit real exchange rate variability between the countries in the monetary union and the remaining EEC countries. Reduction of real exchange rate variability between the "ins" and "outs" appears to be important for the orderly functionning of the European Single Market[31].

The Maastricht Treaty requires convergence in budget deficits and public debts as a precondition for joining a monetary union. But, once admitted the fiscal policies of individual countries are allowed to diverge. An important open question is whether **permanent** fiscal convergence criteria should be instituted for EMU members.

A nominal target or targets for the ECB appears to be desirable. Possible candidates are monetary targets, inflation targets and, perhaps during the transition, exchange rate targets. Further discussion of those issues appears in Cukierman (1995c).

Other open issues include the choice of monetary policy instruments and the degree of uniformity in instruments across countries in the union. An important consideration here is to assure a sufficient degree of arbitrage across different financial centers in the Community so that monetary policy spreads quickly and evenly across the union. Harmonization in the operation of regulation of payment systems is needed to achieve the integration of the interbank market. Similarly extension of harmonization to monetary policy instruments and procedures is desirable in order to avoid regulatory arbitrage and consequent relocation of financial activity. Further discussion of those issues appears in Monticelli and Vinals (1993).

# 11. Instrument Uncertainty and Uncertainty about the

[31]This terminology is due toLamfalussy.

# Structure of the Economy

Thirty years ago Brainard (1967) showed, within a Keynesian framework, that uncertainty about the parameters of the economy reduces the degree of policy activism. The effects of parameter uncertainty on the degree of policy activism and on the inflationary bias of policy has recently been reconsidered within the context of endogenous policymaking of the Barro and Gordon type. In particular Swank (1994) shows that uncertainty about the slope of the short run Phillips curve has no effect on policy activism and on the inflationary bias of policy (see subsection 2.1 above for a definition). Nor does additive uncertainty about the effects of policy instruments.

But **multiplicative** uncertainty about the effect of monetary instruments on money growth and inflation reduces the well known inflationary bias of policy. The intuition is simple. In the presence of higher multiplicative uncertainty about the effect of monetary instuments on inflation the level of inflation uncertainty increases with the degree of policy activism. Since, in those types of models policymakers dislike inflation uncertainty[32] larger multiplicative uncertainty reduces the degree of policy activism and with it the inflationary bias. Thus, in the presence of credibility problems some types of instrument uncertainty may actually increase welfare by reducing the incentive of policymakers to engage in stabilization policy. A related point is made by Devereux (1987). He shows that, within some range, increased monetary uncertainty may increase welfare by raising the degree of wage indexation thereby reducing the incentive of policymakers to stimulate output by means of monetary surprises.

Letterie (1995) extends Swank's (1994) analysis to the case in which the policymaker has private information about an economic shock and can, therefore, engage in socially desirable stabilization policy. In this more general case higher multiplicative uncertainty about the effect of policy instruments has two conflicting effects on welfare. By reducing the degree of policy activism higher uncertainty reduces the inflationary bias as in Swank's framework. But it also reduces the extent to which he utilizes his private information to engage in stabilization policy. This effect reduces welfare. The "optimal" level of instrument uncertainty depends on the parameters of the policymaker's objective function and on the variance of the economic shock. An extension of this

[32]This is usually modelled by assuming that the objective function is quadratic in inflation.

analysis to the case of two policy instruments, each with its own degree of multiplicative uncertainty, appears in Lippi (1995).

As a positive fact the result that multiplicative instrument uncertainty may increase welfare in some cases and reduce it in other is useful and interesting. But this does not mean that instrument uncertainty should deliberately be raised in order to reduce the inflationary bias of policy. It is well known that there are alternative, more efficient devices, to eliminate this bias many of which have been discussed in this survey.

# References


Aizenman J. (1992), ”Competitive Externalities and the Optimal Seignorage”, **Journal of Money Credit and Banking**, 24, 61-71.

Alesina A. (1988), “Macroeconomics and Politics”, in S. Fischer (ed.), **NBER Macroeconomic Annual**, MIT Press, Cambridge, MA.

Alesina A. (1989), “Politics and Business Cycles in Industrial Democracies”, **Economic Policy**, 8, 57-98.

Alesina A. and L. Summers (1993), ”Central Bank Independence and Macroeconomic Performance:Some Comparative Evidence”, **Journal of Money Credit and Banking,** 25, 151-162.

Alesina A. and Gatti R. (1995), “How Independent Should the Central Bank Be ?” , **American Economic Review,** 85, 196-200, May.

Ammer J. and T. Freeman (1994), “Inflation Targeting in the 1990s: The Experiences of New-Zealand, Canada and the United Kingdom”, International Finance D.P. No. 473, Board of Governors of the Federal Reserve System.

Bade R. and M. Parkin (1980, 1985), “Central Bank Laws and Monetary Policy”, Manuscript, Department of Economics, University of Western Ontario.

Baltensperger E. (1993), ”Central Bank Policy and Lending of Last Resort”, in F. Bruni (ed.) **Prudential Regulation,Supervision and Monetary Policy**, The Paolo Baffi Center, Bocconi University.

Barro R.J. and Gordon (1983), ”A Positive Theory of Monetary Policy in a Natural Rate Model”, **Journal of Political Economy,** 91, 589-610.

Brainard W. C. (1967), “Uncertainty and the Effectiveness of Policy”, **American Economic Review**, 57, 411-425.

Bruno M. (1993), **Crisis, Stabilization and Economic Reform: Therapy by Consensus**, Oxford University Press, Oxford.

Bruno M. (1994), "Political Economy of Central Banks: Theory and Practice", Keynote speech delivered at the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Bruno M. and W. Easterly (1994), "Inflation Crises and Long Run Growth", Manuscript, The World Bank, November.

Cukierman A. (1988), "Rapid Inflation-Deliberate Policy or Miscalculation?", **Carnegie-Rochester Conference Series on Public Policy**, 29, Autumn,11-75.

Cukierman A. (1992), **Central Bank Strategy,Credibility and Independence:Theory and Evidence**, The MIT Press, Cambridge, MA.

Cukierman A. (1993), "Central Bank Independence, Political Influence and Macroeconomic Performance: a Survey of Recent Developments", **Cuardenos de Economia**, 30, No. 91, December, 271-291.

Cukierman A. (1994a), "Commitment Through Delegation, Political Influence and Central Bank Independence", in J.O. de Beaufort Wijnholds, S.C.W. Eijffinger and L.H. Hoogduin (eds.), **A Framework for Monetary Stability**, Financial and Monetary Studies, Kluwer Academic Publishers, Dordrecht, Boston,Lancaster.

Cukierman A. (1994b), "Central Bank Independence and Monetary Control", **The Economic Journal**, 104, November, 1437-1448.

Cukierman A. (1995a), "Towards a Systematic Comparison between Inflation Targets and Monetary Targets", in L. Leiderman and L. Svensson (eds.), **InflationTargets** ,CEPR, London.

Cukierman A. (1995b), "How Can the European Central Bank Become Credible?", Paper presented at a CEPR conference on: **What Monetary Policy for the European Central Bank?** , Frankfurt, Germany, June.

Cukierman A. (1995c), "Targeting Monetary Aggregates and Inflation in Europe", paper presented at the conference on **Future European Monetary Policy,** November, 30, December 1, 1995, Frankfurt, Germany, Forthcoming.

Cukierman A. and N. Liviatan (1991), "Optimal Accomodation by Strong Policymakers Under Incomplete Information", **Journal of Monetary Economics**, 27, 99-127.

Cukierman A., S. Webb and B. Neyapti (1992), "The Measurement of Central Bank Independence and its Effect on Policy Outcomes", **The World Bank Economic Review**, 6, September, 439-458.

Cukierman A., S. Edwards and G. Tabellini (1992), "Seignorage and Political Instability", **American Economic Review**, 82, 537-555.

Cukierman A., Kalaitzidakis P., Summers L.H. and Webb S.B. (1993), "Central Bank Independence, Growth, Investment and Real Rates", **Carnegie-Rochester Conference Series on Public Policy**, 39, Autumn, 95-145.

Cukierman A. and S.B. Webb (1995), "Political Influence on the Central Bank: International Evidence", **The World Bank Economic Review**, 9, No. 3, September, 397-423.

Cukierman A., M. Kiguel and L. Leiderman (1996) "Transparency and the Evolution of Exchange Rate Flexibility in the Aftermath of Disinflation", in Z. Eckstein, Z. Hercowitz and L. Leiderman (eds.), **Financial Factors in Stabilization and Growth**, Cambridge University Press, Cambridge, UK and NY, Forthcoming.

Cukierman A.P. Rodriguez and S.B. Webb (1996), "Central Bank Autonomy and Exchange Rate Regimes-Their Effects on Monetary Accomodation and Activism", in S. Eijffinger and H. Huizinga (eds.) **Positive Political Economy-Theory and Evidence**, Cambridge University Press, Cambridge UK and NY, Forthcoming.

Debelle G. and S. Fischer (1994), "How Independent Should a Central Bank Be?", in J. C. Fuhrer (ed.), **Goals, Guidelines and Constraints Facing Monetary Policymakers**, Federal Reserve Bank of Boston.

De Long J. B. and L.H. Summers (1992) "Macroeconomic Policy and Long Run Growth", Manuscript, Harvard University, August.

Devereux M. (1987), "The Effect of Monetary Variability on Welfare in a Simple Macroeconomic Model", **Journal of Monetary Economics**, 19, 427-435.

Downes P. and R. Vaez-Zadeh (1991), (eds.) **The Evolving Role of Central Banks**, IMF, Washington, DC.

Eijffinger S. and E. Schaling (1992), "Central Bank Independence: Criteria and Indices", Research Memorandum No. 548, Department of Economics, Tilburg University.

Eijffinger S. and E. Schaling (1993), "Central Bank Independence in Twelve Industrial Countries", **Banca Nazionale del Lavoro Quarterly Review**, No. 184, March, 64-68.

Eijffinger S. and E. Schaling (1996), "The Ultimate Determinants of Central Bank Independence", in S. Eijffinger and H. Huizinga (eds.) **Positive Political Economy-Theory and Evidence**, Cambridge University Press, Cambridge UK and NY, Forthcoming.

Eijffinger S. and J. Haan de (1995), "The Political Economy of Central Bank Independence", Manuscript, Center, Tilburg University.

Fischer S. (1995), "Modern Central Banking" in F. Capie, C. Goodhart, S. Fischer and N. Schnadt (eds.), **The Future of Central Banking**, Cambridge University Press, Cambridge, UK.

Flood R.F. and P. Isard, (1989), "Monetary Policy Strategies", **IMF Staff Papers**, 36, 612-632.

Goodhart C. and D. Shoenmaker (1993), "Institutional Separation Between Supervisory and Monetary Agencies", in F. Bruni (ed.), **Prudential Regulation,Supervision and Monetary Policy**, The Paolo Baffi Center, Bocconi University.

Goodhart C. and J. Vinals (1994), "Strategy and Tactics of Monetary Policy: Examples from Europe and the Antipodes", DP No. 9425, Bank of Spain.

Grilli V.D. Masciandaro and G. Tabellini (1991), "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries", **Economic Policy**, 13, 341-392.

Haan de J. and J.E. Sturm (1992), "The Case for Central Bank Independence", **Banca Nazionale del Lavoro Quarterly Review,** No. 182, 305-327. Reprinted in M. Parkin (1994), (ed.), **The Theory of Inflation**, Edward Elgar Publishing Company.

Haan de J. and G. J. van 'T Hag (1994), "Variation in Central Bank Independence across Countries: Some Provisional Empirical Evidence", **Public Choice**, 81.

Havrilesky T. M. (1991), "Screening FOMC Members for their Biases and Dependability", **Economics and Politics**, 3, 139-149.

Havrilesky T. M. (1993), **The Pressures on American Monetary Policy**, Kluwer Academic Publishers, Norwell, MA.

Herrendorf B. (1995), “Transparency, Reputation, and Credibility Under Floating and Pegged Exchange Rates”, Manuscript, European University Institute, August.

Hinton-Braaten K. (1994), “New Central Banks”, paper prepared for the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Hochreiter E. (1994), “Central Banking in Economies in Transition: Institutional and Exchange Rate Issues”, paper presented at the Paolo Baffi Conference on **Central Bank Independence and Accountability**, March, Milan, Italy.

Holtfrerich C.L. (1986), **The German Inflation 1914-1923**, Walter de Gruyter, Berlin and New-York.

Johnson D. R. and P. L. Siklos (1994), “Empirical Evidence on the Independence of Central Banks”, Manuscript, Wilfried Laurier University.

Kydland F.E. and Prescott E. (1977), ”Rules Rather than Discretion:The Inconsistency of Optimal Plans”, **Journal of Political Economy**, 85, 473-492.

Leiderman L. and L. Svensson (eds.) (1995), **InflationTargets**, CEPR, London.

Letterie W. (1995),” Imperfect Control of Instruments in a Model of Monetary Policy: Strategy or Constraint ?”, Manuscript, Erasmus University, Rotterdam February.

Lippi F. (1995), “Rules Versus Discretion with Two Policy Instruments”, Discussion Paper 95-156, Tinbergen Institute, Erasmus University, Rotterdam.

Logue D. E. and T. D. Willet (1976), “A Note on the Relation between the Rate and the Variability of Inflation”, **Economica**, 43, 151-158.

Lohmann S. (1992), ”Optimal Commitment in Monetary Policy:Credibility Versus Flexibility”, **American Economic Review**, 82, 273-286.

Maxfield S. (1995), The Politics of Central Banking in Developing Countries, Manuscript, Department of Political Science, Yale University, January.

McCallum B. (1995) ,”Two Fallacies Concerning Central Bank Independence”, **American Economic Review Papers and Proceedings**, 85, 207-211, May.

McKinnon R. I. (1973), **Money and Capital in Economic Development**, The Brookings Institution, Washington, DC.

Melitz J. (1988), "Monetary Discipline, Germany and the European Monetary System: A Synthesis", in F. Giavazzi, S. Micossi and M. Miller, (eds.), **The European Monetary System**, Cambridge University Press, Cambrige, UK.

Meltzer A. H. (1995), "Money and the European Union", paper presented at the conference on **Future European Monetary Policy,** November, 30, December 1, 1995, Frankfurt, Germany.

Monticelli C. and J. Vinals (1993), "European Monetary Policy in Stage Three: What are the Issues ?", CEPR Occasional Paper No. 12.

Obstfeld M. (1991), "Destabilizing Effects of Exchange Rate Escape Clauses", WP No. 3603, NBER, Cambridge, MA.

Pal N. (1993), "The Effect of Statutory Laws on Turnover at the Central Bank", Graduate term paper, Dept. of Economics, Tel-aviv University.

Padoa-Schioppa T. (1994),**The Road to Monetary Union in Europe**,Oxford University Press,Oxford and New-York.

Persson T. and G. Tabellini (1993), "Designing Institutions for Monetary Stability", **Carnegie-Rochester Conference Series on Public Policy**, 39, Autumn, 53-84.

Popov V. (1994), "Central Bank Independence and Inflation in Russia", paper presented at the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Posen A. S. (1993), "Why Central Bank Independence does not Cause Low Inflation: There is No Institutional Fix for Politics", **The Amex Bank Review,** R. Obrien (ed.).

Rimshevichs I. (1994), "The Role of the Central Bank in Supervision: Pros and Cons", paper presented at the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Rogoff K. (1985), "The Optimal Degree of Commitment to a Monetary Target", **Quarterly Journal of Economics**, 100, 1169-1190.

Roll Report (1993), A report of an independent panel chaired by Eric Roll, "Independent and Accountable:A New Mandate for the Bank of England", CEPR, London.

Siklos P. (1994), "Establishing Central Bank Independence: Recent Experiences in Developing

Countries", Manuscript, Wilfried Laurier University, July.

Svensson L. (1995), "Optimal Inflation Targets, 'Conservative' Central Banks and Linear Inflation Contracts", Manuscript, Institute for International Economic Studies, Stockholm University, August.

Swank O.H. (1994), "Better Monetary Control May Increase the Inflationary Bias of Policy", **Scandinavian Journal of Economics**, 96, 125-131.

Tosovsky J. (1994), "The Role of the Central Bank in Transition to a Market Economy", paper presented at the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Triska D. (1994), "Central Bank Independence: The Theory and Practice in the Czech Republic", paper presented at the conference on the **Constitutional Status of Central Banks in Eastern Europe**, University of Chicago Law School, April.

Udell G. F. and P. Wachtel (1994), "Financial System Design for Formerly Planned Economies: Defining the Issues", EC-94-27, School of Business, NYU, December

Walsh C. (1995a), "Optimal Contracts for Independent Central Bankers", **American Economic Review**, 85, March, 150-167.

Walsh C. (1995b), "Is New-Zealand's Reserve Bank Act of 1989 an Optimal Central Bank Contract?", **Journal of Money, Credit and Banking**, Forthcoming.